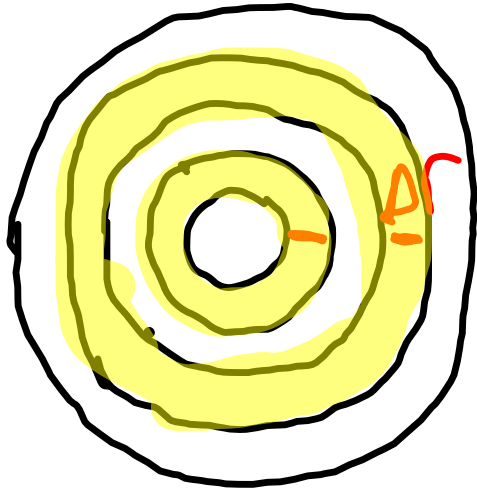
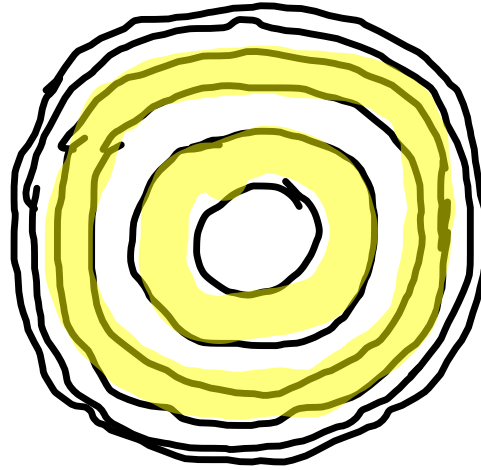


3.4 b other rates of change



A



B

$\Delta r = \text{width}$

$\Delta A = \text{area of ring}$

Tree rings
which is more realistic?

Δr constant

ΔA increases

(same good weather
every year.)

Δr decreases

ΔA constant

$$A = \pi r^2$$

$A = \text{area of circle}$

$$\frac{dA}{dr} = 2\pi r$$

$$\frac{dA}{dr} \approx \frac{\Delta A}{\Delta r}$$



how fast area changes
compared to how fast radius changes

constant

$$\frac{\Delta A}{\Delta r} \approx 2\pi r \cdot \Delta r$$

↑
↓

business, economics

marginal - derivative

marginal cost - der. of cost

marginal revenue - der of revenue

marginal profit - der of profit

$$\text{Profit} = \text{Revenue} - \text{cost}$$

ex 7 $C(x) = x^3 - 6x^2 + 15x$

x = number of radiators
produced

$$R(x) = x^3 - 3x^2 + 12x$$

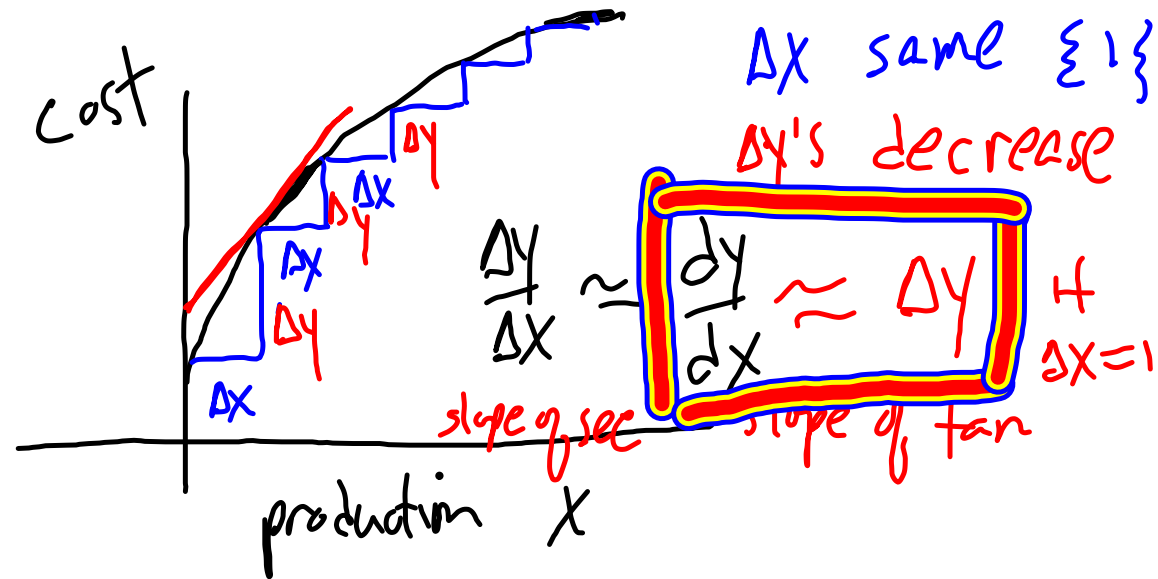
marginal cost = $C'(x) = 3x^2 - 12x + 15$

marginal revenue = $R'(x) = 3x^2 - 6x + 12$

for the 11th radiator

$$\left. \begin{array}{l} C'(10) = 195 \$ \\ R'(10) = 252 \$ \end{array} \right\} \text{what do they mean?}$$

$$P'(10) = 252 - 195 = 57 \$$$

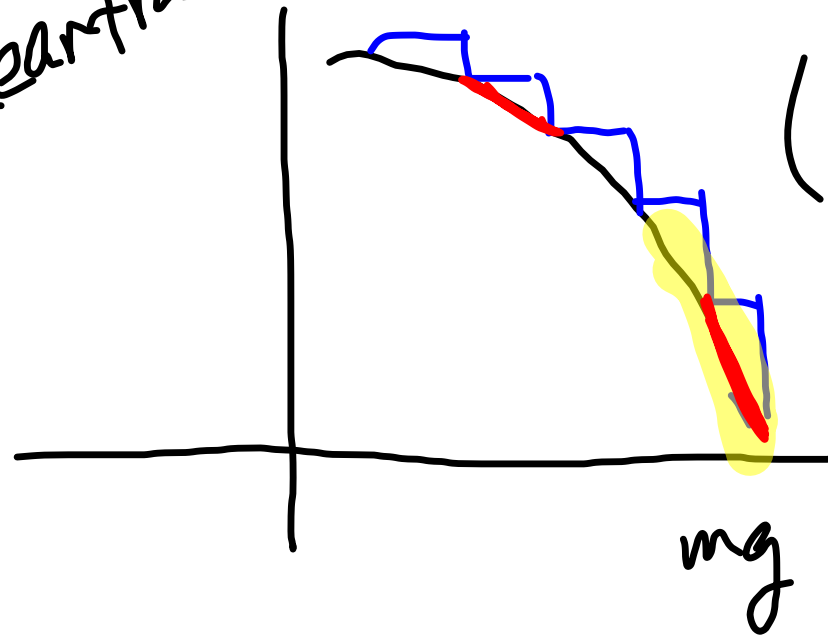


what does this graph tell us about
 our company?

the more radiators you make, the
 cheaper each one is to make

medicine - der \approx sensitivity
(ex 6) to change

heartrate



(steeper).
more sensitive
to change